

MAKR 700: INTRODUCTION TO MAKERSPACES

Originator

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Justification / Rationale

Changing discipline to Business.

Effective Term

Fall 2023

Credit Status

Credit - Non Degree Applicable

Subject

MAKR - Makerspace

Course Number

700

Full Course Title

Introduction to Makerspaces

Short Title

INTRODUCTION TO MAKING

Discipline**Disciplines List**

ALL DISCIPLINES

Modality

Face-to-Face

Hybrid

Catalog Description

Introduction to the Maker Movement, a survey of cultures, disciplines, materials, and technologies related to the traditions of making through time and around the world. Students will recognize key materials and techniques of disciplines including the arts, construction, engineering, and computer science to critically analyze and apply ways of creating that support an understanding of culturally significant work of diverse peoples and eras. Through readings, discussion, and hands-on building, students construct insights, strategies, and skills to bring their ideas and projects from concept to completion.

Schedule Description

This course explores makerspaces, maker culture, and equipment that accelerate maker tinkering. Through readings, discussion, and hands-on building, students construct insights, strategies, and skills to bring their ideas and projects from concept to completion.

Lecture Units

2

Lecture Semester Hours

36

Lab Units

1

Lab Semester Hours

54

In-class Hours

90

Out-of-class Hours

72

Total Course Units

3

Total Semester Hours

162

Prerequisite Course(s)

Take MAKR 301 Take MAKR 302

Required Text and Other Instructional Materials**Resource Type**

Book

Open Educational Resource

No

Author

Dougherty, Dale, and Ariane Conrad

Title

Free to Make: How the Maker Movement is Changing our Schools, our Jobs, and our Minds

Year

2016

Resource Type

Book

Open Educational Resource

No

Author

Hirshberg, Peter, Dale Dougherty, and Marcia Kadanoff

Title

Maker City: A Practical Guide for Reinventing our American Cities

Year

2016

ISBN #

978-1680452631

Resource Type

Book

Open Educational Resource

No

Author

Mark Hatch

Title

The Maker Movement Manifesto

Year

2013

Resource Type

Web/Other

Open Educational Resource

Yes

Description

Websites related to the making community, including Make Magazine (<https://makezine.com/blog/>), Instructables: How to Make Anything (<https://www.instructables.com/>), and Tinkering studio (<https://www.exploratorium.edu/tinkering>)

Resource Type

Web/Other

Open Educational Resource

Yes

Description

Instructor generated handouts and presentations on topics laid out in course content, such as Historical and social aspects of making, innovations in arts and sciences, challenges and failure, processes and techniques, Maker Movement, and community.

Resource Type

Web/Other

Year

2015

Description

How the Intersection of Art and Science Made History - https://www.huffpost.com/entry/at-the-intersection-of-arts-and-science_b_6771222

For Text greater than five years old, list rationale:

There have been no updated books published that cover the Maker movement. The websites listed will provide updated materials.

Class Size Maximum

20

Course Content

- A. Introduction to making and the Maker Movement
1. Making disciplines
 2. Historical, cultural, and social context
 3. The global makerspace culture
 4. Challenges faced by makers
 5. Failure as a catalyst to success
- B. Methods, materials, and processes
1. Overview of equipment used in a makerspace
 2. Safety issues relating to specific maker equipment
 3. New technology and equipment for making
 4. Software used for maker projects
 5. Collaborating with makers across disciplines
 6. Problem solving and iterative design
 7. Approaches and techniques specific to disciplines

Lab Content

- Safety training on equipment
- Learning equipment software
- Hands-on use of makerspace equipment (e.g., laser cutter, 3D printer, vinyl printer, etc.)
- Developing projects with multiple pieces of equipment

Course Objectives

Objectives	
Objective 1	Identify leading figures in the maker movement and their contributions.
Objective 2	Recognize and explore the maker movement locally, regionally, and statewide.
Objective 3	Demonstrate knowledge of equipment used in making and its safe use.
Objective 4	Apply fabrication techniques that employ a variety of materials in the context of different disciplines.
Objective 5	Collaborate with other makers.
Objective 6	Create prototypes and complete projects by using historical and contemporary design and problem-solving skills.

Student Learning Outcomes

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Analyze the historical, cultural, and social contexts of making.
Outcome 2	Identify leading figures in the maker movement and their contributions.
Outcome 3	Operate multiple pieces of maker equipment to complete creative projects.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Lecture	Describe terminology and verbally describe the historical, social, and cultural relevance of processes or objects.
Participation	Discussions to make contextual and historical connections and analyze contributions made by disciplines related to traditions of making.
Demonstration, Repetition/Practice	Showing students how makerspace equipment can be used in creation.
Laboratory	Students will use makerspace to create a product or prototype.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Oral and practical examination	Quizzes, exams, and in-class participation demonstrate proficiency in the subject matter. Quizzes will be outside of class, some exams will be in class, and some outside of class. Participation will be in class.	In and Out of Class
Laboratory projects	Completion of projects that demonstrate the understanding of the equipment and how it is used in creating. Any laboratory work not completed in the classroom will be completed outside of the classroom. Final project will be outside of class. Expected 2 hours a week to complete all lab projects.	In and Out of Class
Written homework	Written reports designed to assess the application of maker principles and practices. For example: Develop a basic maker project and write a tutorial module to add to a project binder. Expected 2 hours a week for homework.	Out of Class Only
Group activity participation/observation	Class discussion and group problem-solving activities. Scenarios not finished in class will be completed outside of the classroom.	In and Out of Class

Assignments
Other In-class Assignments

1. Read articles in Make Magazine and discuss articles with the class.
2. Work as a group to review equipment documentation. Be prepared to be quizzed on the equipment's operation and functions.
3. Students complete short assignments incorporating at least two disciplines or materials in support of learning about the historical, cultural, and social context of making, such as Sound Circuits - Exploring sound in relation to social norms and change,

using circuit design and soldering skills to make sound-producing circuits, Concrete Applications - casting a concrete doorstop with a rope finial, cast a planter pot, or a geometric shape using a basic recipe from ancient roman times, Font Creation - Using a programming language such as Python and a drawing library, students create a proof of concept for their own font by designing four letters, Draw StringBag - design and sew a drawstring bag using a lock stitch machine, the hand whipstitch, and a tunnel drawstring, and adding a digital component to the bag such as a programmable microcontroller.

Other Out-of-class Assignments

1. Short writing assignments such as an essay concerning a cultural practice and related technology of the maker movement over time.
2. Weekly reading assignments that provide formal, cultural, and historical context in relation to the curriculum, projects, and major learning outcomes.
3. Preparation for project completion such as research of visual references, drawing, and assigned readings.
4. Final prototype/project that uses at least two different disciplines and builds upon information and working methods learned from earlier assignments. Projects such as: *Egg Drop Prototype - design and engineer a visually engaging container that prevents an egg from breaking after an approximately sixteen-foot drop. *Open TheBox - identify a historical innovation that relied on designers dissecting a technology to create a new one, choose an existing product that is not intended to be deconstructed, appropriate its technology and alter it to create something new. *Build a Simple Machine- using an ancient machine such as a lever, wedge, screw, inclined plane, pulley, wheel, or axle as a basis incorporate applicable modern technology such as a micro-controller to allow programming to initiate physical action. *Tool Modification - Invent or alter a prehistoric tool to meet an identified human need. Create sketches, build prototype(s), and then develop a marketing/sales pitch for your product by creating finished drawings, 3D models, or computer renderings showing how it can be used.

Grade Methods

Letter Grade Only

Distance Education Checklist

Include the percentage of online and on-campus instruction you anticipate.

Online %

65

On-campus %

35

What will you be doing in the face-to-face sections of your course that necessitates a hybrid delivery vs a fully online delivery?

The lecture can be done online, but the making essential to this course must be done onsite at the makerspace.

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?

Students will take their project ideas to the lab to complete the creation process.

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?

Create by using historical and contemporary design and problem-solving skills. An instructor or makerspace director will be available in the lab at all times.

How will you assess the online delivery of lab activities?

N/A

Instructional Materials and Resources

Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

Within Course Management System:

Discussion forums with substantive instructor participation

Online quizzes and examinations

Regular virtual office hours

Timely feedback and return of student work as specified in the syllabus

External to Course Management System:

Direct e-mail
Telephone contact/voicemail

For hybrid courses:

Orientation, study, and/or review sessions
Scheduled Face-to-Face group or individual meetings

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

Whether taught hybrid or in-person, the instructor will use asynchronous text and video messages to interact with the students. Also, discussion boards and constant announcements will be used. In-person and zoom virtual office hours with screen sharing and interaction capabilities will be available.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.

Students will interact in the Makerspace where they will complete projects with instructor guidance and assistance.

Other Information**Provide any other relevant information that will help the Curriculum Committee assess the viability of offering this course in an online or hybrid modality.**

Hybrid allows students to complete the lecture materials at their own pace, which is beneficial for students with a challenging schedule. The lab portion will remain onsite, providing students with access to the instructor and other students.

MIS Course Data**CIP Code**

52.0201 - Business Administration and Management, General.

TOP Code

050100 - Business and Commerce, General

SAM Code

C - Clearly Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Funding Agency Category

Not Applicable

Program Status

Stand-alone

Transfer Status

Not transferable

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Files Uploaded**Attach relevant documents (example: Advisory Committee or Department Minutes)**

LMI - Makerspaces.pdf

Approvals**Curriculum Committee Approval Date**

11/01/2022

Academic Senate Approval Date

11/10/2022

Board of Trustees Approval Date

12/16/2022

Chancellor's Office Approval Date

12/22/2022

Course Control Number

CCC000635132